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Attorney Docket No.: UDL1P072

First Named Inventor:

Robert Edmund TODD

Natalie Stolec
Natalie Stolec

TRANSMITTAL LETTER FOR A PCT INTERNATIONAL APPLICATION ENTERING THE NATIONAL STAGE IN THE U.S. AS A DESIGNATED or ELECTED OFFICE UNDER 35 USC 371

Commissioner for Patents
Box PCT
Attention: DO/EO
Washington, DC 20231

Transmitted herewith are the papers required to enter the national stage in the U.S. as a designated office/elected office for the following PCT international patent application:

INTERNATIONAL APPLICATION NUMBER: PCT/GB00/02777

Int'l Filing Date: July 19, 2000

1st Priority Date: August 25, 1999

Inventor(s): Robert Edmund TODD

For: AUTOMATIC INSTALLATION PROCESS FOR WIRELESS COMMUNICATION SYSTEM

☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f))

The United States Patent Office is: (select one)

☐ A Designated Office (No Demand was filed - See 37 CFR 1.494)

☒ An Elected Office (A Demand for Preliminary Examination was Filed - See 37 CFR 1.495)

Enclosures:

☒ A copy of the international application (if this line is not checked, the international application was previously communicated by the International Bureau or the international application was originally filed in the U.S. PTO).

☐ An English Translation of the International Application

☐ A Combined Declaration and Power of Attorney

☐ A copy of amendments made under PCT Article 19

☐ A translation of amendments made under PCT Article 19

☐ A translation of amendments made under PCT Article 34 (annexes to the international preliminary examination report)

☒ A copy of the amendments made under PCT Article 34 (annexes to the international

10069210/069245

JC19 Rec'd PCT/PTO 20 FEB 2002

preliminary examination report)

- ☒ Information Disclosure Statement with Form 1449 and cited references
- ☐ An Assignment of the Invention to: .
(with \$40.00 recordal fee)
- ☒ A Preliminary Amendment
- ☒ A copy of the International Search Report
- ☒ A copy of the Preliminary Examination Report
- ☐

Fee Calculation:

<input type="checkbox"/>	Applicant is entitled to Small Entity Status under 37 C.F.R. §1.27.	
<input checked="" type="checkbox"/>	BASIC FEE	\$890.00
	(IPEA-U.S. \$710/355; ISA-U.S. \$740/370; PTO not ISA or IPEA \$1040/520; U.S. IPEA all claims meet 33(2)-(4) \$100/50; File w/ EPO or JPO search report \$890/445;)	
<input type="checkbox"/>	Surcharge for filing a late oath or declaration (\$130/65)	\$
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<input type="checkbox"/>	Assignment recordal fee (\$40)	\$
<input type="checkbox"/>	Multiple dependent claims (\$280/140)	\$
<input type="checkbox"/>	Excess claims - see calculation below	\$
	Total Claims: 09- 20 = 00 X \$18/9 claim =	\$
	Independent Claims: 02- 3 = 00 X \$84/42 ind. claim =	\$
	Excess Claim Total	\$
	TOTAL FEES	\$890.00

☒ Check No. 14138 in the amount of \$890.00 is enclosed cover the filing fees (including the basic national fee under 37 CFR 1.492(a)) as calculated above.

☒ The Commissioner is authorized to charge any fees beyond the amount enclosed which may be required, or to credit any overpayment, to Deposit Account No. 500388 (Order No. UDL1P072).

General Authorization for Petition for Extension of Time (37 CFR §1.136)

☒ Applicants hereby make and generally authorize any Petitions for Extensions of Time as may be needed for any subsequent filings. The Commissioner is also authorized to charge any extension fees under 37 CFR §1.17 as may be needed to Deposit Account No. 500388 (Order No. UDL1P072).

☒ Please send correspondence to the following address:

Customer Number 022434



Date: February 20, 2002

Steve D Beyer
Steve D Beyer
Registration No. 31,234

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Robert Edmund TODD

Attorney Docket No.: UDL1P072

Application No.: Unassigned

Examiner: Unassigned


Filed: Herewith

Group: Unassigned

Title: AUTOMATIC INSTALLATION PROCESS
FOR WIRELESS COMMUNICATION
SYSTEM

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Natalie Stolec

PRELIMINARY AMENDMENT

Commissioner for Patents
Box PCT
Washington, D.C. 20231

Dear Sir:

Prior to examination, please enter the following amendments.

In the Claims:

Please cancel claims 6 & 11.

Please replace the pending claims with the following claim set. A marked-up version of the claims is attached.

1. A method of inserting a communications module into a wireless communication system comprising at least one control module and a plurality of first communications modules, wherein the system is adapted to transmit messages either directly or indirectly between modules, and wherein each said first communications module is adapted to receive a wireless message and transmit said message to a further first communications module or to a said control module, and is programmed with respective addresses identifying modules with which it communicates messages directly when in a communication mode, the method comprising:

i) causing a second communications module, which is to be inserted into the system, to transmit a first signal in a set-up mode; and

(ii) if said first signal is detected by at least two said modules capable of communicating directly with each other, causing said second communications module, by means of a second signal from at least one said control module updating the address of one of said modules which detected said first signal, to be installed to communicate directly, when in said communication mode, with two said modules which detected said first signal, including the module whose address was updated by said second signal.

2. A method according to claim 1, wherein the step of causing said communications module to be inserted to communicate directly with said two modules comprises updating the address of said modules adapted to transmit messages in the system subsequently to the communications module to be inserted.

3. A method according to claim 2, wherein said addresses are consecutively numbered, and said updating step comprises incrementing the numbers of the addresses of said modules adapted to transmit messages in the system subsequently to the communications module to be inserted.

4. A method according to claim 1, further comprising the step of testing reliability of communications links between said communications module to be inserted and the two modules with which it is to communicate directly when in said communication mode.

5. A method according to claim 4, wherein the step of testing reliability comprises exchanging at least one message between said communications module to be inserted and said two modules.

7. A method of automatically setting up a wireless communication system comprising at least one control module and a plurality of communications modules, wherein the system is adapted to transmit messages either directly or indirectly between modules, and wherein each said communications module is adapted to receive a wireless message and transmit said message to a further communications module or to a said control module, and is

programmed with a respective address identifying modules with which it communicates messages directly when in a communication mode, the method comprising:

- (i) causing a first communications module to transmit a first signal in a set-up mode;
 - (ii) if said first signal is received by at least one said control module, causing said first communications module, by means of a second signal from a said control module which received said first message, to communicate in said communication mode directly with said control module which received said first message;
 - (iii) causing a second communications module to transmit a third signal in a set-up mode;
 - (iv) if said third signal is detected by said first communications module and said control module which received said first message, causing, by means of a fourth signal from said control module, said second communications module to communicate directly with the first communications module and said control module, and said first communications module to communicate directly with said second communications module, in said communication mode.
8. A method according to claim 7, further comprising the step of inserting at least one further communications module by means of a method according to claim 1.
9. A method according to claim 7, further comprising the step of testing reliability of communications links between modules intended to communicate directly with each other.
10. A method according to claim 7, further comprising the step of changing the or each said communications module from said set-up mode to said communications mode by means of a signal from at least one said control module.

REMARKS

Note that the pending claims are based on the article 34 amendments submitted during the international phase of the corresponding PCT application.

Should the Examiner have any questions regarding this Preliminary Amendment, please do not hesitate to contact the undersigned.

Respectfully submitted,
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

4. A method according to [any one of the preceding] claim[s] 1, further comprising the step of testing reliability of communications links between said communications module to be inserted and the two modules with which it is to communicate directly when in said communication mode.

8. A method according to claim [6] 7, further comprising the step of inserting at least one further communications module by means of a method according to [any one of] claim[s] 1 [to 6].

9. A method according to [any one of the preceding] claim[s] 7, further comprising the step of testing reliability of communications links between modules intended to communicate directly with each other.

10. A method according to [any one of the preceding] claim[s] 7, further comprising the step of changing the or each said communications module from said set-up mode to said communications mode by means of a signal from at least one said control module.

AUTOMATIC INSTALLATION PROCESS FOR WIRELESS COMMUNICATION SYSTEM

The present invention relates to a method of inserting communications modules into a wireless communication system having at least one control module and a plurality of communications modules, wherein the system transmits wireless either directly or indirectly between pairs of said modules. The invention relates particularly, but not exclusively, to a method of inserting communications modules into a system in which a high degree of reliability is required, such as in a security or fire alarm system.

Wireless communications systems are known in which one or more control modules transmit wireless messages around the system, either directly or indirectly, via successive radio frequency communications modules, each of which is designed to receive a message and transmit the message onwards in the system and is allocated a predetermined position in the order of message transmission. This enables wireless messages to be relayed across relatively large distances without the need for high powered transmitters, which in certain countries are subject to fairly stringent licensing requirements.

Known communications systems of this type suffer from the drawback that if one of the communications modules is moved, reliability of signal transmission paths around the system can no longer be relied upon, or the communications modules must be re-configured, which is a considerably time consuming process. Also, if a new communications module is inserted into the system, it is a fairly laborious process to re-configure the other units in the system (i.e. re-allocate their positions in the order of message transmission) in order to take account of the new unit. In particular, in broadcast systems it is usually necessary to program into the new unit system numbers, unit numbers, type identifiers and so on. The programming of

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these parameters is relatively difficult for untrained personnel, thus increasing the cost and difficulty of operating the system. These numbers are sometimes inserted by means of software, but most often by means of a series of switches (of which there are usually 8 or 16), each of which needs to be set in one of two positions by personnel. This clearly makes setting up the system more labour intensive and therefore increases its cost.

Preferred embodiments of the present invention seek to overcome the above disadvantages of the prior art.

According to an aspect of the present invention there is provided a method of inserting a communications module into a wireless communication system comprising at least one control module and a plurality of first communications modules, wherein the system is adapted to transmit messages either directly or indirectly between modules, and wherein each said first communications module is adapted to receive a wireless message and transmit said message to a further first communications module or to a said control module, and is programmed with respective addresses identifying modules with which it communicates messages directly when in a communication mode, the method comprising:

- i) causing a second communications module, which is to be inserted into the system, to transmit a first signal in a set-up mode; and
- (ii) if said first signal is detected by at least two said modules capable of communicating directly with each other, causing said second communications module, by means of a second signal from at least one said control module updating the address of one of said modules which detected said first signal, to be installed to communicate directly, when in said communication mode, with two said modules which detected said

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first signal, including the module whose address was updated by said second signal.

This provides the advantage that the system can be automatically configured as each module is added to the system in such a way that reliability of communication links is maximised. In addition, the advantage is provided that difficult procedures such as programming in system numbers and the like are avoided as this can be carried out automatically by the system of the invention.

In a preferred embodiment, the step of the step of causing said communications module to be inserted to communicate directly with said two modules comprises updating the address of said modules adapted to transmit messages in the system subsequently to the communications module to be inserted.

In a preferred embodiment, said addresses are consecutively numbered, and said updating step comprises incrementing the numbers of the addresses of said modules adapted to transmit messages in the system subsequently to the communications module to be inserted.

The method may further comprise the step of testing reliability of communications links between said communications module to be inserted and the two modules with which it is to communicate directly when in said communication mode.

Said step of testing reliability preferably comprises exchanging at least one message between said communications module to be inserted and said two modules.

According to another aspect of the invention, there is provided a method of method of automatically setting up a wireless communication system comprising at least one control module and a plurality of communications modules, wherein the system is adapted to transmit messages either directly or indirectly

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between modules, and wherein each said communications module is adapted to receive a wireless message and transmit said message to a further communications module or to a said control module and is programmed with a respective address identifying modules with which it communicates messages directly when in a communication mode, the method comprising:

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- (i) causing a first communications module to transmit a first signal in a set-up mode;
- (ii) if said first signal is received by at least one said control module, causing said first communications module, by means of a second signal from a said control module which received said first message, to communicate in said communication mode directly with said control module which received said first message;
- (iii) causing a second communications module to transmit a third signal in a set-up mode;
- (iv) if said third signal is detected by said first communications module and said control module which received said first message, causing, by means of a fourth signal from said control module, said second communications module to communicate directly with the first communications module and said control module, and said first communications module to communicate directly with said second communications module, in said communication mode.

The method may further comprise the step of inserting at least one further communications module according to a method as defined above.

The method preferably further comprises the step of testing reliability of communications links between modules intended to communicate directly with each other.

The method may further comprise the step of changing the or each said communications module from said set-up mode to said communication mode by means of a signal from at least one said control module.

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This provides the advantage of enabling the system to automatically make itself ready to communicate wireless messages when the communications modules have been inserted.

As an aid to understanding the invention, a preferred embodiment thereof will now be described, by way of example only and not in any limitative sense, with reference to the accompanying drawings, in which:-

Figure 1 shows a first step in a process embodying the present invention for introducing a first communications module into a wireless communication system;

Figure 2 shows a subsequent step to the step of Figure 1;

Figure 3 shows a subsequent step to the step of Figure 2;

Figure 4 shows a subsequent step to the step of Figure 3;

Figure 5 shows a first step in inserting a second communications module into the system of Figures 1 to 4;

Figure 6 shows a subsequent step to the step of Figure 5;

Figure 7 shows a subsequent step to the step of Figure 6;

Figure 8 shows a subsequent step to the step of Figure 7;

Figure 9 shows the communication system in which the master unit, first unit and second unit are inserted;

Figure 10 shows a first step in inserting a third communications module into the system of Figures 1 to 9;

Figure 11 shows a subsequent step to the step of Figure 10;

Figure 12 shows an alternative step to the step of Figure 11; and

Figure 13 shows a step in which the radio frequency communications links of the system of Figures 10 to 12 are tested.

Referring to Figure 1, a wireless communication system 1 such as a security system or fire alarm system initially comprises a master unit 2 comprising a control module, and a first communications module 3. The process of installing the communications module 3 in the system 1 is begun by switching the master unit 2 to its auto install mode. The first communications module 3 is then switched on, and the switching on of the communications module 3 automatically causes that module to go into its auto install mode. As a result, the first module 3 transmits a "Hello" message containing information identifying the first module 3.

If the master unit 2 receives the "Hello" signal from the first module 3, it responds with an "Ack" (acknowledgement) message, followed by an "init" (initialisation) message (Figure 2). The initialisation message initialises new communications modules (such as the first module 3) as they are installed in the system to give them a unique ID number reflecting their position in the system (i.e. the other modules in the system with which they exchange messages directly).

All communications modules in the system 1, and the master unit 2, have a unique ID number, but the master unit 2 has an additional ID number, i.e. the master unit 2 has ID numbers #0 and a further number equal to the number of communications modules in the system 1 plus 1. This reflects the fact that the master unit 2 is both the beginning and the end of the chain of communication in the system 1. In the arrangement shown in Figure 2, therefore, assuming that no other

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shown in Figure 9 in which each of the master unit 2 and communications modules 3,4 can communicate directly with the other two. If, on the other hand, the second module 4 is out of radio range of either the master unit 2 or the first module 3, the "Hello" message is not detected by both the master unit 2 and first module 3, as a result of which the second module 4 is not installed.

Referring now to Figure 10, when a third module 5 to be installed is switched on, it transmits a "Hello" signal in a similar manner to the first 3 and second 4 modules. This "Hello" signal must be heard by two other units 2,3 or 4, or the third module 5 will not be installed. If the "Hello" message is received by the first and second modules 3,4 but not by the master unit 2, the third unit 5 is installed between those modules as ID #2, since it is known that the third module 5 can communicate directly with both of those modules. The master unit 2 and first module 3 then increment their ID numbers. The reliability of the radio frequency communication link between the third module 5 and the first and second modules 3,4 is then carried out, and the third module 5 configured if the test is successful.

Referring now to Figure 11, when a fourth module 6 to be installed is switched on (and therefore automatically enters its auto-install mode), it transmits a "Hello" message which must be received by at least two units having consecutive ID numbers (i.e. two units which can communicate directly with each other), otherwise it will not be installed. For example if the "Hello" message is received by the second module 4 (ID #1) and the first module 3 (ID #3) only, it will not be installed (Figure 11). If, on the other hand, the "Hello" message from the fourth module 6 is received by two units having consecutive ID numbers, it will be installed between these two units, as shown in Figure 12. If more than one pair of units having consecutive ID numbers detects the "Hello" message, the fourth module 6 is installed between the pair of

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consecutively numbered units having the lowest ID numbers. For example, if the "Hello" message is received by the master unit 2 and the first 3 and second 4 communications modules, the fourth module 6 is installed between the master unit 2 and second unit 4 with ID #1.

When the fourth module 6 has been initialised with an ID number, the reliability of the radio frequency communication links to that module 6 is tested in the manner described earlier. When the module 6 has then been configured, it is successfully installed, and additional modules can then be installed in an analogous manner. The system 1 can revert to its communication mode.

It will be appreciated by persons skilled in the art that the above embodiment has been described by way of example only and not in any limitative sense, and that various alterations and modifications are possible without departure from the scope of the invention as defined by the appended claims.

ART 34 AMDT

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CLAIMS

1. A method of inserting a communications module into a wireless communication system comprising at least one control module and a plurality of first communications modules, wherein the system is adapted to transmit messages either directly or indirectly between modules, and wherein each said first communications module is adapted to receive a wireless message and transmit said message to a further first communications module or to a said control module, and is programmed with respective addresses identifying modules with which it communicates messages directly when in a communication mode, the method comprising:

i) causing a second communications module, which is to be inserted into the system, to transmit a first signal in a set-up mode; and

(ii) if said first signal is detected by at least two said modules capable of communicating directly with each other, causing said second communications module, by means of a second signal from at least one said control module updating the address of one of said modules which detected said first signal, to be installed to communicate directly, when in said communication mode, with two said modules which detected said first signal, including the module whose address was updated by said second signal.

2. A method according to claim 1, wherein the step of causing said communications module to be inserted to communicate directly with said two modules comprises updating the address of said modules adapted to transmit messages in the system subsequently to the communications module to be inserted.

3. A method according to claim 2, wherein said addresses are

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consecutively numbered, and said updating step comprises incrementing the numbers of the addresses of said modules adapted to transmit messages in the system subsequently to the communications module to be inserted.

4. A method according to any one of the preceding claims, further comprising the step of testing reliability of communications links between said communications module to be inserted and the two modules with which it is to communicate directly when in said communication mode.

5. A method according to claim 4, wherein the step of testing reliability comprises exchanging at least one message between said communications module to be inserted and said two modules.

6. A method of installing a communications module in a wireless communication system comprising at least one control module and a plurality of first communications modules, wherein the system is adapted to transmit messages either directly or indirectly between modules, and wherein each said first communications module is adapted to receive a wireless message and transmit said message to a further first communications module or to a said control module, and is programmed with respective addresses identifying modules with which it communicates messages directly when in a communication mode, the method substantially as hereinbefore described with reference to the accompanying drawings.

7. A method of automatically setting up a wireless communication system comprising at least one control module and a plurality of communications modules, wherein the system is adapted to transmit messages either directly or indirectly between modules, and wherein each said communications module is adapted to receive a wireless message and transmit said message to a further communications module or to a said control module, and is programmed with a respective address identifying modules

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with which it communicates messages directly when in a communication mode, the method comprising:

- (i) causing a first communications module to transmit a first signal in a set-up mode;
- (ii) if said first signal is received by at least one said

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control module, causing said first communications module, by means of a second signal from a said control module which received said first message, to communicate in said communication mode directly with said control module which received said first message;

- (iii) causing a second communications module to transmit a third signal in a set-up mode;
- (iv) if said third signal is detected by said first communications module and said control module which received said first message, causing, by means of a fourth signal from said control module, said second communications module to communicate directly with the first communications module and said control module, and said first communications module to communicate directly with said second communications module, in said communication mode.

8. A method according to claim 7, further comprising the step of inserting at least one further communications module by means of a method according to any one of claims 1 to 6.

9. A method according to any one of the preceding claims, further comprising the step of testing reliability of communications links between modules intended to communicate directly with each other.

10. A method according to any one of the preceding claims, further comprising the step of changing the or each said communications module from said set-up mode to said communications mode by means of a signal from at least one said control module.

11. A method of automatically setting up a wireless communication system comprising at least one control module adapted to transmit wireless messages via a plurality of

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communications modules, wherein each said communications module is adapted to receive a wireless message and transmit said message to a further communications module or to a said control module and is programmed with a respective address identifying modules with which it communicates messages directly when in a communication mode, the method substantially as hereinbefore described with reference to the accompanying drawings.

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(19) World Intellectual Property Organization
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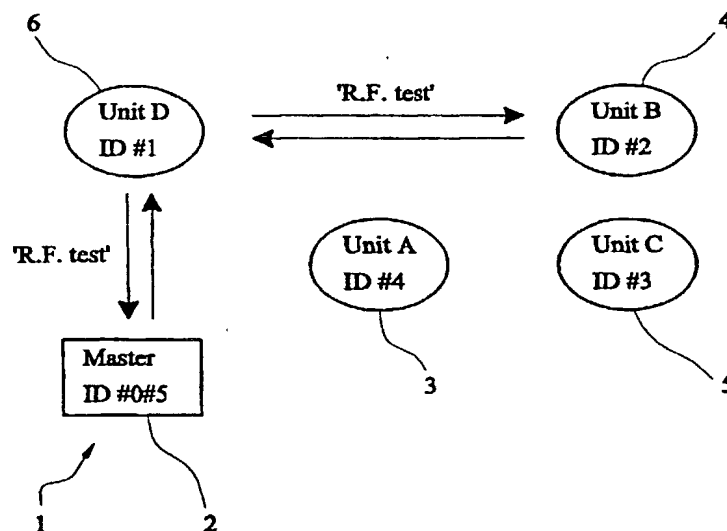
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Low Warden, Hexham, Northumberland NE46 4DN (GB).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **TODD, Robert,**

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **AUTOMATIC INSTALLATION PROCESS FOR WIRELESS COMMUNICATION SYSTEM**



(57) Abstract: A method of inserting a communications module (6) into a wireless communication system (1) comprising at least one control module (2) and a plurality of communications modules (3, 4, 5) is disclosed. The system (1) is adapted to transmit messages either directly or indirectly between modules and each module is adapted to receive a wireless message and transmit a wireless message to a further communications module or to a control module. The communications module (6) is inserted into the system (1) and transmits a first signal in a set-up mode. If the first signal is detected by at least one pair of modules (2, 3, 4, 5), the communications module (6), by means of a signal from a control module (2), is installed to communicate directly with the two modules of at least one pair of modules.

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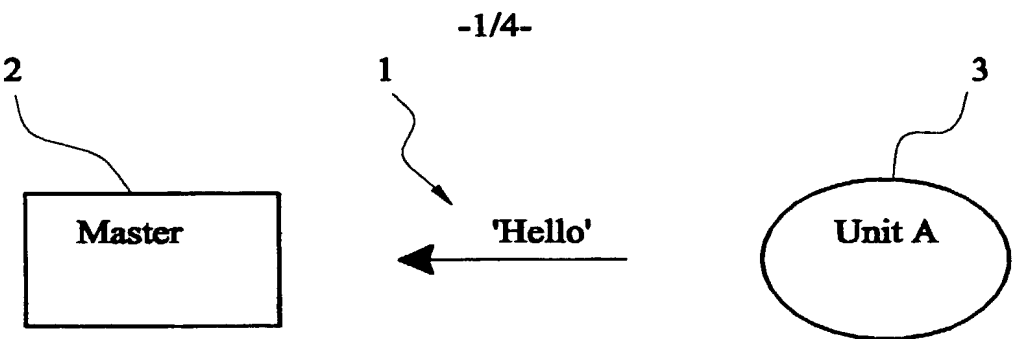


FIG. 1

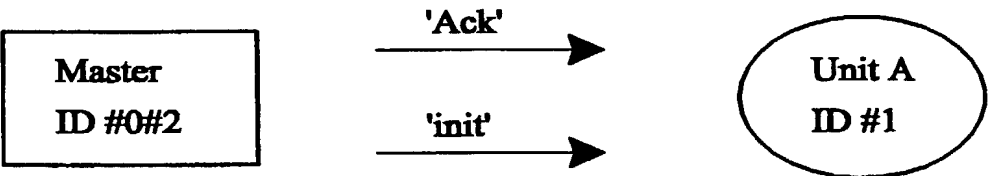


FIG. 2

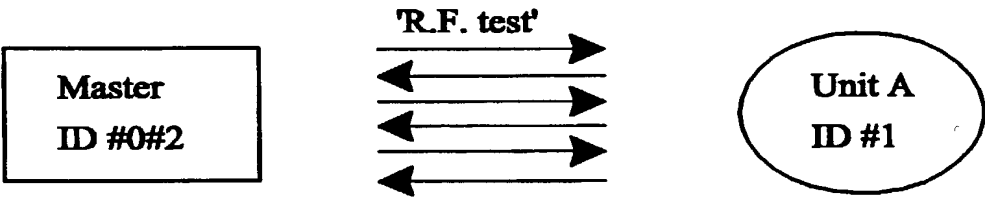


FIG. 3

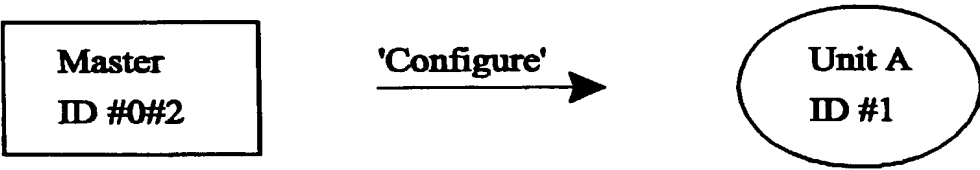


FIG. 4

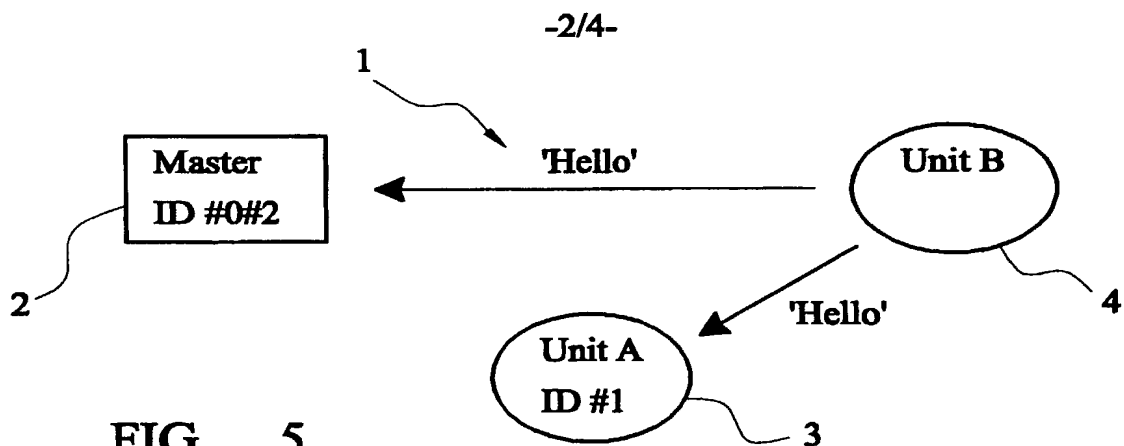


FIG. 5

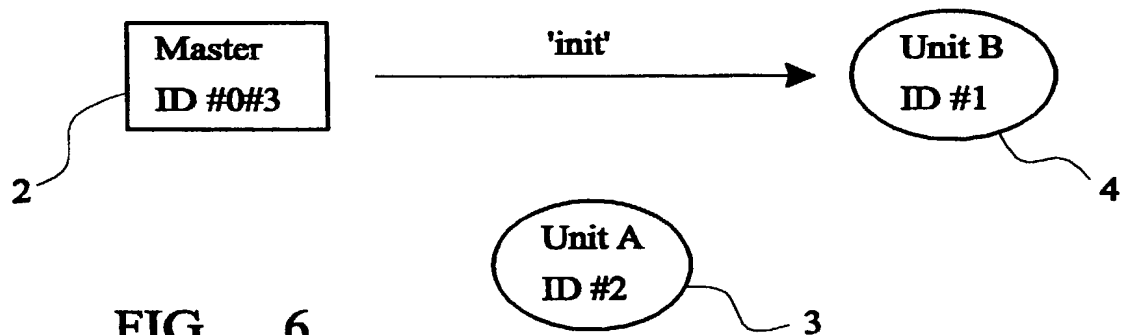


FIG. 6

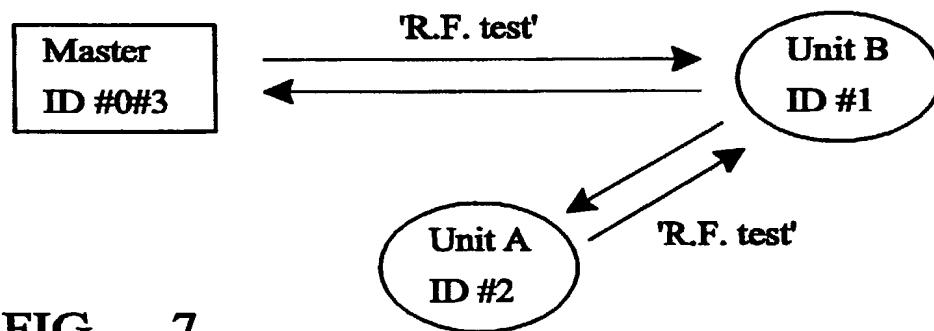


FIG. 7

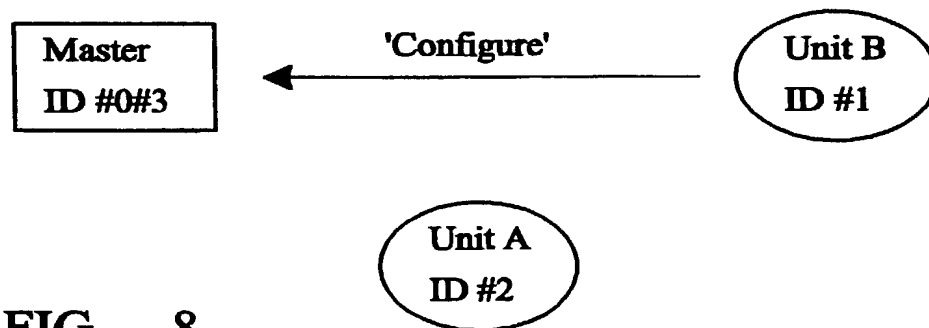


FIG. 8

-3/4-

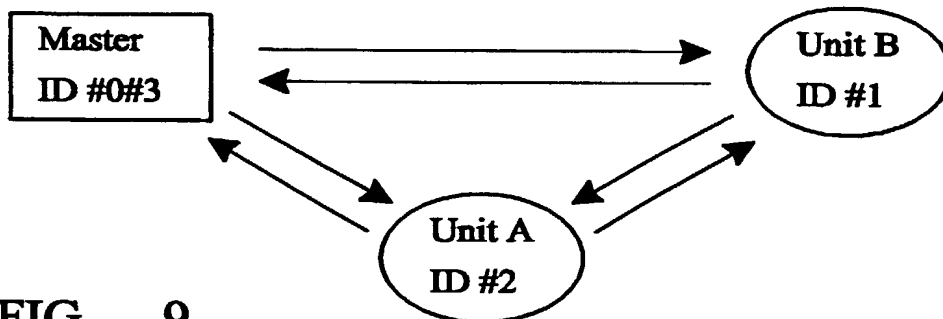


FIG. 9

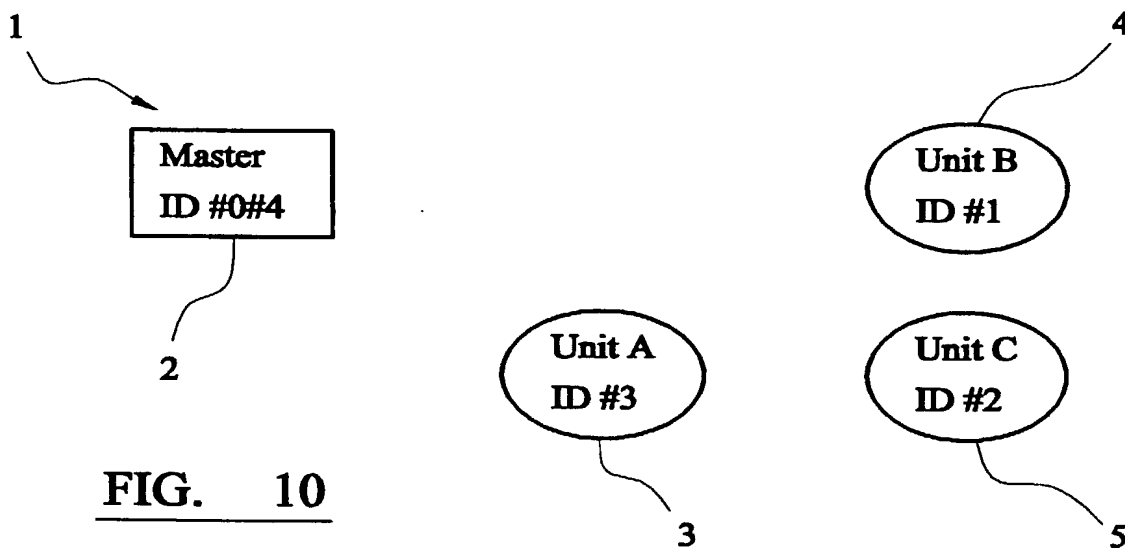


FIG. 10

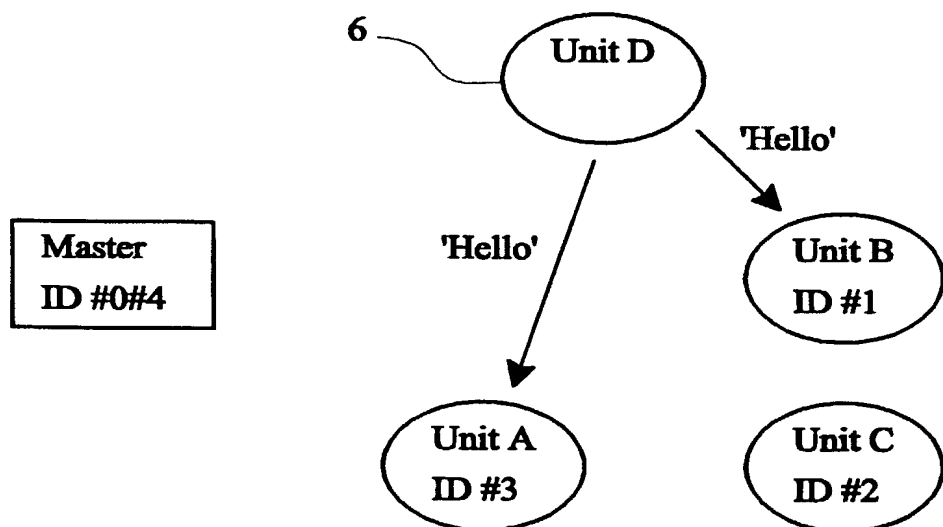


FIG. 11

-4/4-

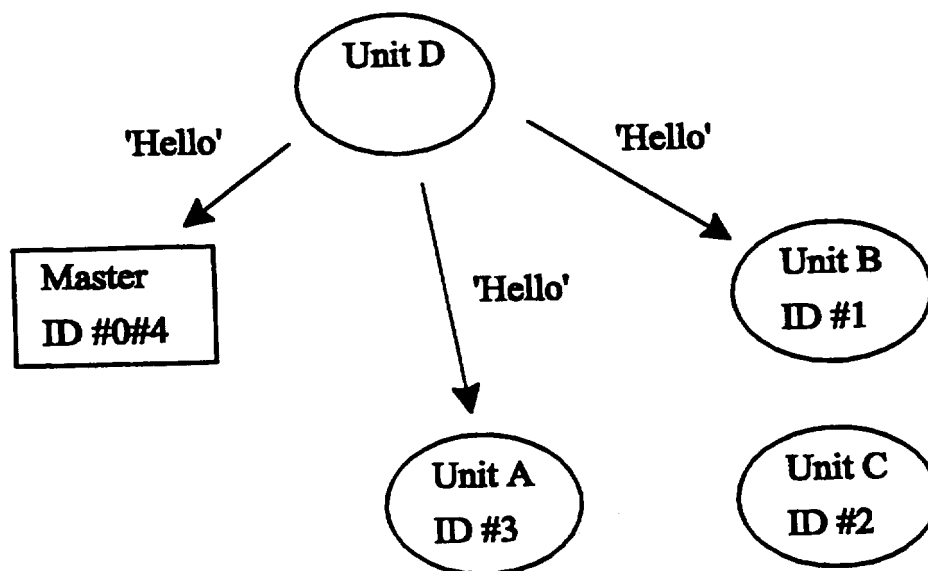


FIG. 12

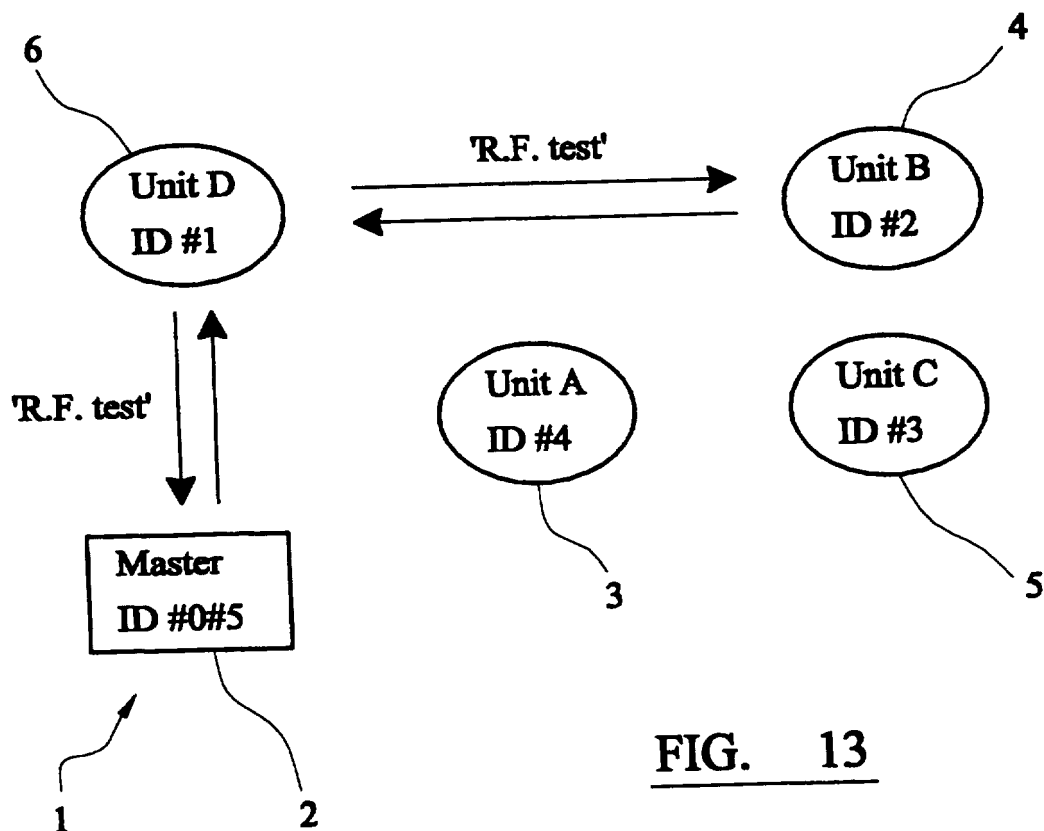


FIG. 13

DECLARATION AND POWER OF ATTORNEY FOR ORIGINAL U.S. PATENT APPLICATION

Attorney's Docket No. UDL1P072

As a below-named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: AUTOMATIC INSTALLATION PROCESS FOR WIRELESS COMMUNICATION SYSTEM the specification of which,

(check one)

1. ☐ is attached hereto.
2. ☐ was filed on _____ as
U.S. Application No. _____
and was amended on _____.
3. ☒ was filed on July 19, 2000 as
International PCT Application No. PCT/GB00/02777
and was amended on _____.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, CFR § 1.56.

Prior Foreign Application(s)

I hereby claim foreign priority benefits under Title 35, United States code, § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed:

9920015.6
(Application No.)

Great Britain
(Country)

August 25, 1999
(Filing Date)

Priority Benefits Claimed?
Yes ☒ No ☐

(Application No.)

(Country)

(Filing Date)

Yes ☐ No ☐

Provisional Application(s)

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below:

(Application No.)

(Filing Date)

(Application No.)

(Filing Date)

650 961 8301

Prior U.S. Application(s)

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

_____ (Application No.)	_____ (Filing Date)	_____ (Status - patented, pending, abandoned)
_____ (Application No.)	_____ (Filing Date)	_____ (Status - patented, pending, abandoned)

Power of Attorney

And I hereby appoint the law firm of Beyer Weaver & Thomas, LLP and all practitioners who are associated with the Customer Number 022434 as my principal attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Direct Correspondence To:**Customer Number: 022434****Direct Telephone Calls To:****Steve D Beyer at telephone number (650) 961-8300**

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Typewritten Full Name of**Sole or First Inventor:** Robert Edmund TODD**Citizenship:** Great Britain**Inventor's signature:** [Signature]**Date of Signature:** 5/6/2002**Residence:** (City) Northumberland**Country:** Great Britain**Post Office Address:** 38 Broadway, Blyth, Northumberland NE24 2PP, Great Britain